

# NIST MEP Strategic Planning Exercise: Supply Chain Initiatives

## Objective

Connect MEP's on-the-ground knowledge with macro-level monitoring and analysis in order to enable broad visibility across supply chains, identify trends and vulnerabilities, and respond accordingly.

## Challenge/need

Manufacturing is only as strong as the supply chain that supports it. A manufacturer's ability to serve its market depends directly on the reliable and timely sourcing of inputs and resources. For large manufacturers, critical supplies can be secured with a combination of redundant sourcing and advance payment. Small manufacturers who cannot afford such measures are in an inherently more precarious position. Supply chains, like the companies and relationships that comprise them, are both dynamic and fluid. Weak links can take multiple forms, including reliance on a single source, or remote, particularly offshore, suppliers. Each supplier, in turn, is only as reliable as its own supply chain. Ultimately, the performance of the manufacturer is inextricably linked to the health of the supply chain.

The macroeconomic events of the past three years have exposed many vulnerabilities in supply chains. Single-source dependency has become more perilous as suppliers cease operations, either due to worker shortages or their own supply challenges. Air travel disruptions severely impede the movement of goods previously sourced from other countries. Ports lack adequate capacity to unload ships waiting in harbors. Manufacturers are forced to identify new suppliers – scrambling to find domestic sources and cultivating multiple sources to supplement those suffering interrupted operations.

MEP is uniquely positioned to respond to these circumstances, with thirty years of experience working with the nation's small and medium-sized manufacturers (SMMs) to address known vulnerabilities and proactively strengthen domestic manufacturing capabilities. The MEP National Network™ is greater than the sum of its 51 Centers, having invested for years in sharing best practices and collaborative programs. The Network, much like manufacturers' supply chains, is defined as much by the relationships between Centers as the expertise and capabilities in each of them.

## Strategy

MEP positions itself at all levels of the supply chain, from original equipment manufacturers (OEMs) to SMMs, as well as the relevant state and federal stakeholders. Connecting top-down data and needs requirements with bottom-up capabilities, for which the MEP National Network is known and trusted, will help optimize the resilience of the nation's manufacturing sector.

## MEP and the future of supply chains

MEP links market information and business opportunities so that MEP Centers and their clients can respond quickly to new market opportunities and new supply sources. As small companies often do

not have access to tools for market analysis, MEP links these companies to information sources regarding emerging public and private market opportunities, helping all U.S. suppliers and federal partners accelerate their response to market opportunities and supply chain pressures. Additional considerations include:

- What is MEP's role in Buy American statements from the federal government?
- What is MEP's role in understanding technology drivers that influence SMMs?

### MEP and collaboration among companies

The future success of manufacturing companies relies on their ability to deliver the right product at the right time, in the right quantity and at the right price. However, competitiveness depends on companies rapidly and effectively developing products in response to changing customer demand. Competitiveness also depends on their rapid response to any problems regarding the speed, quantity, quality and cost of delivering products to customers. Manufacturing companies deal with supply chain issues every day, ranging from identifying new suppliers and materials through manufacturing, transporting and distributing products to customers. High-performing supply chains collaborate through multiple tiers to quickly identify and mitigate volatility. This enables companies to develop, manufacture and distribute new or improved products more rapidly, increasing their competitiveness in the global manufacturing environment. MEP should increase its focus on services linking companies, enabling greater agility all along the supply chain. MEP should engage OEMs to understand their requirements. Combined with the work MEP Centers already do with SMMs, this additional capability will enable coordination within industry sectors or across regions, substantially increasing economic impact.

### Tactics may include:

- Deliver easy access to manufacturing opportunities available across federal agencies to match up with MEP client manufacturing capabilities
- Identify and expand the access to materials and production capabilities that are critical to national health, defense and competitiveness
- Develop national-level manufacturing support for securing critically needed products in emergency situations for national health, defense and competitiveness
- Employ a systematic process where MEP Center technical staff, who have a deep knowledge of manufacturing, identify suppliers (MEP Supplier Scouting) and match them to potential customers and partners (matchmaking); this activity may include a database, but is primarily enabled by people using database technology for support
- Partner with organizations that support small, job shop-type manufacturers to compete with larger manufacturers, such as Paperless Source
- Define and segment supply chains so that the critical issues become visible in a way that creates focus and understanding, so that they can be solved discretely and comprehensively
- Partner with federal agencies and private top-tier entities to identify supply chain gaps, shortcomings and critical areas of attention

- Expand MEP Supplier Scouting to identify and facilitate new sources of domestic supply to fill supply chain gaps, including for federal procurements to reduce Buy American waivers, consistent with Executive Order 14005
- Coordinate the concept of a national supply chain database, with and among individual MEP Centers, to connect U.S. manufacturers cohesively at the national level with potential customers, suppliers and partners; expand and prioritize supplier scouting and related supplier matchmaking; partner with federal agencies to find domestic suppliers to support Buy American policies and target appropriate industries for reshoring
- Create an MEP National Network suite of tools that coordinate and align each individual Centers' ability to effect change along critical supply chains
- Provide a risk mitigation service that will assist Department of Defense prime contractors and other large manufacturers to drive improvement and technology implementation at lower levels of their supplier network
- Assist individual U.S. manufacturers to become more resilient by addressing both the technical and business means for them to implement integrated strategies for addressing change across their business environment; this will allow them to pivot and enter new supply chains, improving their competitiveness in current global markets
- Position the MEP National Network as a critical resource for supply chain development by convening critical stakeholders and catalyzing practical approaches to the most difficult supply problems

## Manufacturer impacts

- Diversification of customers and markets
- Risk identification and management within supply chain
- Increased operational agility, and by extension, resilience

## Manufacturing impacts

- Timely response to critical domestic needs
- Robust domestic supply strategies
- Visibility into lower tiers, enabling supply chain optimization and ensuring operational reliability

## Desired outcomes/metrics and expectations

- Supplier scouting matches
- Resulting impacts, including increased sales and cost savings
- Increased domestic production of strategic products and critical industries
- Creation of new quantitative metrics for supply chain strength, vulnerability and mitigations

**Fund Center-specific projects including:**

<b>Potential project*</b>	<b>Manufacturer impact</b>	<b>Manufacturing/supply chain impact</b>	<b>Metrics</b>	<b>Pricing</b>
Centers pilot MEP Supplier Scouting using different database platforms and demonstrate data sharing and interoperability among the disparate systems.	<ul style="list-style-type: none"> <li>Improved access to suppliers and customers for SMMs</li> </ul>	<ul style="list-style-type: none"> <li>Improved market resilience to disruptions</li> </ul>	<ul style="list-style-type: none"> <li># of companies participating</li> <li># of supplier scouting connections</li> <li># clients served</li> <li>Client-reported impacts</li> </ul>	<ul style="list-style-type: none"> <li>\$200,000 - \$2,000,000 (or whatever is the eligible maximum amount is)</li> </ul>
Centers partner with an OEM (or group of OEMs) within a priority national supply chain to provide supplier development or other services to improve resilience of the supply chain.	<ul style="list-style-type: none"> <li>Improved MEP client resilience in a critical supply chain</li> </ul>	<ul style="list-style-type: none"> <li>Improved critical supply chain resilience</li> </ul>	<ul style="list-style-type: none"> <li># of suppliers participating</li> <li># of OEMs and top tiers participating</li> <li># of supplier scouting connections</li> <li># clients served</li> <li>Client-reported impacts</li> </ul>	<ul style="list-style-type: none"> <li>\$50,000 - \$2,000,000 (or whatever is the eligible maximum amount is)</li> </ul>
Centers develop the MEP Manufacturer Resilience Playbook based on the MEP Manufacturer Resilience Framework via delivery of services to suppliers within specific supply chains.	<ul style="list-style-type: none"> <li>Demonstrate adoption of resilience framework</li> <li>Document best practices</li> </ul>	<ul style="list-style-type: none"> <li>More SMMs successfully improve resilience</li> </ul>	<ul style="list-style-type: none"> <li># suppliers adopting resilience playbook</li> <li># clients served</li> <li>Client-reported impacts</li> </ul>	<ul style="list-style-type: none"> <li>\$50,000 - \$1,000,000</li> </ul>
Centers enable MEP clients by working with companies to pivot or diversify markets to fill gaps in domestic production of critical technologies, key products and critical supply chains.	<ul style="list-style-type: none"> <li>Access to new markets in critically needed areas</li> </ul>	<ul style="list-style-type: none"> <li>Diversification of supply chain for critical products</li> </ul>	<ul style="list-style-type: none"> <li># of clients served</li> <li># clients served</li> </ul>	<ul style="list-style-type: none"> <li>\$50,000 - \$2,000,000 (or whatever is the eligible maximum amount is)</li> </ul>
Centers develop and deploy reshoring services to increase domestic supply of critical products.	<ul style="list-style-type: none"> <li>New markets for critical products</li> </ul>	<ul style="list-style-type: none"> <li>Diversification of supply chain for critical products</li> </ul>	<ul style="list-style-type: none"> <li># manufacturers served</li> <li>Client-reported impacts</li> </ul>	<ul style="list-style-type: none"> <li>\$75,000 - \$500,000</li> </ul>

Potential project*	Manufacturer impact	Manufacturing/supply chain impact	Metrics	Pricing
Centers work with companies on risk management, including cybersecurity, to identify the triggers of risk events, the importance of developing a plan to mitigate them when they do occur, and how to establish monitoring metrics and activities to be prepared for the inevitable.	<ul style="list-style-type: none"> <li>Demonstrate how the financial impact of risk is determined and why a risk management plan is an essential element to operational efficiency</li> </ul>	<ul style="list-style-type: none"> <li>SMMs are more aware of risks and better prepared for emergencies</li> </ul>	<ul style="list-style-type: none"> <li># of manufacturers served</li> <li>Client-reported impacts</li> </ul>	<ul style="list-style-type: none"> <li>\$75,000 - \$500,000</li> </ul>
Centers work with small and medium-sized manufacturers to gain a better understanding of roles in the supply chain and how they contribute to reaching goals of the top tier, thereby increasing value to the customer.	<ul style="list-style-type: none"> <li>Partner engagement improves supply chain results and performance by developing and synchronizing a plan that aims to reach tier one manufacturers' overall goals. It is intended for all members of the chain based on a holistic view of the entire supply chain.</li> </ul>	<ul style="list-style-type: none"> <li>SMMs are more responsive, and OEMs and tier one organizations have more options, thus growing U.S. manufacturing.</li> </ul>	<ul style="list-style-type: none"> <li># of manufacturers served</li> <li>Client-reported impacts</li> </ul>	<ul style="list-style-type: none"> <li>\$50,000 to \$1,000,000</li> </ul>
Centers develop and deliver executive supply chain strategy services designed for company leaders that are responsible for charting the course of an organization, providing executives with a mechanism to better understand the cause and effect of decisions within the supply chain.	<ul style="list-style-type: none"> <li>Provides executives with a mechanism to better understand the cause and effect of decisions within the supply chain. It also provides a method to understand the critical areas controlling the performance of the supply chain, and foster collaboration among the supply chain.</li> </ul>		<ul style="list-style-type: none"> <li># of manufacturers served</li> <li>Client-reported impacts</li> </ul>	<ul style="list-style-type: none"> <li>\$50,000 - \$1,000,000</li> </ul>

\*Centers should not submit projects to develop a National Supply Chain Database. Projects associated with a National Supply Chain Database should focus on interoperability among databases in use within Centers.

# NIST MEP Strategic Planning Exercise: Technology and Innovation

## Subtopics

Technology demonstration, cybersecurity, technology adoption

## Objective

Drive development and adoption of proven advanced manufacturing technology, integrating cybersecurity which will enable innovation. Catalyze innovation by establishing and growing advanced manufacturing technology ecosystems that align, connect and facilitate resources for smaller manufacturers to allow them to use state-of-the-art R&D institutions, federal labs and higher education institutions. Scale up the number of manufacturers digitalizing their production processes while simultaneously adopting cybersecurity practices.

## Challenge/need

- Nearly 99% of all U.S. manufacturing establishments are small and medium-sized manufacturers (SMMs) with fewer than 500 employees; approximately 91% have fewer than 100 employees. SMMs employ approximately 71% of domestic manufacturing workforce. SMM technical sophistication lags behind that of large companies. Without increases in SMM adoption of advanced technology, U.S. manufacturing adoption of advanced technology will remain constrained.
- SMMs need significant assistance in bridging the gap between their own state of practice and the state of the art available in key product, technology and industry areas.
- Decreasing financial and operational risks in deploying advanced technology is critical to SMM adoption. Multiple national priorities have been identified/exist in multiple industries, involving a diverse array of technologies and products. In response, demonstrating these technologies and implementing its adoption is necessary to address a broad array of national priorities.
- Manufacturers need resources and flexibility, including mobile options, to inform decision-makers and address the time demands, and to enable businesses to properly evaluate advanced technologies and increase confidence in the potential return on investment.

## Strategy

Fund MEP Centers to pursue tech demonstration center partnerships, large-scale cybersecurity deployment and specialized technology adoption projects.

The MEP Centers become the primary advanced manufacturing knowledge base and resource in their market for smaller manufacturers. The MEP Center understands and translates what advanced manufacturing technology is and how it can support growth and improve their bottom line.

Position each MEP Center to convene, connect and coordinate the local advanced manufacturing ecosystem resources and support the voice of the small and medium-sized manufacturers.

### Tactics may include:

- Expand MEP National Network™ expertise and capabilities in-house and through stronger partnerships in Industry 4.0, cybersecurity and advanced technology
- Showcase successful, relevant company examples and demonstration facilities
- Convene and facilitate collaborations between original equipment manufacturers (OEMs), Industry 4.0 technology developers and SMMs to define digital transformation and adoption pathways
- Provide solutions through a national team of MEP Center staff that are experts in advanced manufacturing and cybersecurity, and who have the skills to help smaller manufacturers address their major technology challenges.
- Develop virtual programming of spacing for plant layout to enhance workflow/production
- Partner with existing or create new demonstration centers that manufacturers can get to easily; create mobile demonstration centers “in a box” that can be transported to remote areas; deploy technology demonstration through higher education (minority-serving institutions, tribal colleges and universities, Hispanic-serving institutions, community colleges, universities, etc.)
- Develop project assessments to identify opportunities to apply technology; assess needs, help design solutions, develop business cases, and bring in qualified vendors and integrators
- Leverage OEM national connection to help suppliers adopt advanced manufacturing technology
- Match early-stage companies that are moving into manufacturing with training and technical assistance, including making connections to other players in local innovation ecosystems such as Second Muse in New York and others around the country
- Provide mobile training on advanced manufacturing technology and cybersecurity for remote and rural manufacturers
- Facilitate connections and technical assistance/problem-solving between federal labs, universities, Manufacturing USA institutes and manufacturing companies – for both established and early-stage companies
- MEP Centers will act as connector and project manager, ensuring that company needs are effectively serviced by research institutions. This requires a dedicated team of staff who build knowledge and relationships with labs and academic institutions. This effort will also need to be coordinated at the local, state and national levels.
- Support entrepreneurs and early-stage companies that are moving into manufacturing with training and technical assistance, including making connections to other players in local innovation ecosystems
- Tighten the linkage between manufacturing and R&D, and act as the voice of manufacturing production to strategically influence the national and local R&D agenda; identify the technologies where the U.S. should strive to lead and own the intellectual property, and develop plans to capture domestic production of these critical new or emerging technologies

## Manufacturer impacts

- Increased awareness, understanding, training on and deployment of advanced manufacturing technology by SMMs
- Increased SMM productivity and workforce capabilities
- Improved attractiveness of manufacturing as a career option for engineering and trades
- Improved SMM technology investment, safety, cybersecurity risk management
- New market and growth opportunities for SMMs in higher margin markets

## Manufacturing impacts

- Increased domestic production for key product, technology and industry areas, contributing to:
  - An increase in manufacturing's contribution to the nation's gross domestic product (GDP)
  - A decrease in the trade deficit for the U.S.
- Accelerate and increase availability of high quality and complex manufactured products, contributing to increased U.S. national and economic security and public health
- Decreased life cycle costs of complex manufactured products
- Increased presence of manufacturing as a contributor to local economic development strategies and approaches
- Wage growth for manufacturing workers due to the upskilling of capability

## Measures

- Count of technology projects established and operating, to include counts and identification of partners involved in the technology projects; SMM clients served by technology projects; and key products, technologies and industries addressed by technology projects
  - Non-MEP program funding, meaning no federal funds appropriated for the program and/or funds used as match, leveraged by technology projects
  - Different operational forms of manufacturing technology demonstration facilities (MTDFs), e.g., user facility, tech college training facility, teaching factory, mobile demonstration lab, MEP Center demonstration facility, etc.
- Count of MEP Center projects with SMMs focused on advanced manufacturing technology, to include projects focused on awareness, training and secure implementation
  - Counts of instances where projects resulted in actual in-factory implementations by SMMs
  - Counts of SMMs and/or individuals trained on the safe and secure technology implementation
- Count of MEP-Assisted Technology and Technical Resource (MATTR) projects leveraging NIST laboratories in terms of consultations with NIST technical experts and cooperative research and development agreements with NIST labs
- Change in percentage of domestic content in key product, technology and industry areas (and contribution to changing/decreasing U.S. trade balance)



- Count of technologies tested for applicability, usability, safety and/or security prior to inclusion in MTFD
- Count of technologies where MEP Center(s) successfully influenced the design of the technology to improve that technology’s usability, safety, security or cost

## Desired outcomes/metrics and expectations

### What is the desired outcome?

To reach small and medium sized manufacturers in the U.S. marketplace to deliver information on advanced manufacturing, cybersecurity basic practices and increase the number of technology adoption projects by 15% in the first year.

### Fund Center-specific projects including:

Potential project*	Manufacturer impact	Manufacturing impact	Metrics	Pricing
Showcase of advanced manufacturing technologies (e.g., Industry 4.0, artificial intelligence, augmented reality, virtual reality, etc., such as the South Dakota and Indiana Robotics Initiative)	<ul style="list-style-type: none"> <li>• Awareness/understanding of new technologies</li> </ul>	<ul style="list-style-type: none"> <li>• Growth of technology adoption to increase capacity and capability for domestic supply chain.</li> </ul>	<ul style="list-style-type: none"> <li>• # of events/demos</li> <li>• # of technologies showcased</li> <li>• # of manufacturers attending</li> <li>• Follow-up metrics</li> </ul>	<ul style="list-style-type: none"> <li>• Up to \$2,000,000 (or whatever the maximum amount is)</li> </ul>
Establish and operate an MTFD within an MEP Center	<ul style="list-style-type: none"> <li>• Technology deployments</li> <li>• Production and quality increases</li> <li>• Cost reductions</li> </ul>	<ul style="list-style-type: none"> <li>• Local manufacturing GDP growth</li> <li>• Worker wage growth</li> </ul>	<ul style="list-style-type: none"> <li>• # of events/demos</li> <li>• # of technologies showcased</li> <li>• # of manufacturers engaged</li> <li>• # of projects initiated</li> <li>• Follow-up metrics</li> <li>• Funding leveraged</li> <li>• # of funding partners</li> </ul>	<ul style="list-style-type: none"> <li>• Up to the maximum</li> </ul>
Establish and operate an MTFD in collaboration with and located at local partner organizations	<ul style="list-style-type: none"> <li>• Technology deployments</li> <li>• Production and quality increases</li> <li>• Cost reductions</li> </ul>	<ul style="list-style-type: none"> <li>• Local manufacturing GDP growth</li> <li>• Worker wage growth</li> </ul>	<ul style="list-style-type: none"> <li>• # of events/demos</li> <li>• # of technologies showcased</li> <li>• # of manufacturers engaged</li> <li>• # of projects initiated</li> <li>• Follow-up metrics</li> <li>• Funding leveraged</li> <li>• # of funding partners</li> </ul>	<ul style="list-style-type: none"> <li>• Up to the maximum</li> </ul>

Potential project*	Manufacturer impact	Manufacturing impact	Metrics	Pricing
Establish and operate a mobile MTDF	<ul style="list-style-type: none"> <li>• Technology deployments</li> <li>• Production and quality increases</li> <li>• Cost reductions</li> </ul>	<ul style="list-style-type: none"> <li>• Local manufacturing GDP growth</li> <li>• Worker wage growth</li> </ul>	<ul style="list-style-type: none"> <li>• # of events/demos</li> <li>• # of technologies showcased</li> <li>• # of manufacturers engaged</li> <li>• # of projects initiated</li> <li>• Follow-up metrics</li> <li>• Funding leveraged</li> <li>• # of funding partners</li> </ul>	<ul style="list-style-type: none"> <li>• Up to the maximum</li> </ul>
Pilot and document how to serve technology needs of SMMs with NIST technical resources via MATTR, to include MEP Center training on delivery of MATTR services	<ul style="list-style-type: none"> <li>• # clients served, associated individual impacts</li> </ul>	<ul style="list-style-type: none"> <li>• Critical needs for technologies successfully satisfied through domestic capabilities</li> <li>• Domestic measurement technology advantages translated directly into competitiveness</li> </ul>	<ul style="list-style-type: none"> <li>• Centers trained</li> <li>• MATTR agreements executed</li> <li>• Scorecard impacts of projects</li> <li>• Reported company impacts resulting from collaborations</li> </ul>	<ul style="list-style-type: none"> <li>• \$75,000 to \$500,000</li> </ul>
Facilitate connections and technical assistance/problem-solving between federal labs, universities, Manufacturing USA institutes and manufacturing companies – for both established and early-stage companies (e.g., extension of embed, Tech Bridge partnership, tech transfer partnerships for commercialization)	<ul style="list-style-type: none"> <li>• SMMs grow as a result of new technology adoption</li> </ul>	<ul style="list-style-type: none"> <li>• Domestic technology applications translated directly into competitiveness</li> </ul>	<ul style="list-style-type: none"> <li>• # of technology provider/SMM collaborative projects</li> <li>• Reported company impacts resulting from collaborations</li> </ul>	<ul style="list-style-type: none"> <li>• \$75,000 - \$300,000</li> </ul>
Demonstrate the successful integration of cybersecurity protections for manufacturing operational technology (OT) into Center delivery of Industry 4.0 services	<ul style="list-style-type: none"> <li>• # of secured client technology deployments</li> <li>• Improved cyber-resilience of production operations</li> </ul>	<ul style="list-style-type: none"> <li>• Reductions in cyber-risks of technologically advanced and competitive supply base</li> </ul>	<ul style="list-style-type: none"> <li>• # of OT protection projects executed</li> <li>• # of Centers executing OT protection projects</li> <li>• # of customers served</li> </ul>	<ul style="list-style-type: none"> <li>• \$50,000 to \$500,000</li> </ul>

Potential project*	Manufacturer impact	Manufacturing impact	Metrics	Pricing
Demonstrate the successful delivery of cybersecurity assistance to manufacturers operating within commercial/non-defense supply chains	<ul style="list-style-type: none"> <li># of non-defense clients served</li> <li>Improved cyber-resilience of production operations.</li> </ul>	<ul style="list-style-type: none"> <li>Reductions in cyber-risks of technologically advanced and competitive supply base</li> </ul>	<ul style="list-style-type: none"> <li># of non-Department of Defense (DOD) protection projects executed</li> <li># of Centers executing non-DOD protection projects</li> <li># of customers served</li> </ul>	<ul style="list-style-type: none"> <li>\$50,000 to \$500,000</li> </ul>

\*Projects should target critical technologies, key products and national priority supply chains.

## NIST MEP Strategic Planning Exercise: Workforce Initiatives

### Objective

To support manufacturers' skilled and diverse workforce needs and to address worker shortages in the manufacturing industry with new approaches to recruitment, retraining and retention.

### Challenge/need

There is an urgent shortage of skilled workers that is inhibiting manufacturing growth. By closing this gap we can grow the industry and lift the entire nation. Companies can accelerate the adoption of Industry 4.0 technologies with access to more STEM talent. There is a need to rebrand manufacturing as a career of choice. To win the battle for talent now and in the future, we need to be as innovative in the way we manage people and build winning workplace cultures as we are with our products and services.

- The skills required to be successful in the manufacturing industry are changing. Manufacturers can keep up by scaling apprenticeship and other "grow your own" programs. Additionally, upskilling programs are needed to take advantage of new technologies and approaches to improve productivity.
- Engaging the historically Black colleges and universities (HBCUs), Hispanic-serving institutions, and tribal colleges and universities to attract a more diverse workforce into manufacturing as employees and small manufacturing business owners.
- Unemployed and underemployed workers, particularly in disadvantaged communities, present a large pool of new workers that can help grow the industry. Recruiting this untapped talent pool requires new types of training, and addressing systemic barriers such as transportation and child care.

- Engaging the unemployed and underemployed workers, particularly in disadvantaged communities, people of color, and women that represent a large pool of new workers that can help grow the industry. Populations considered underserved: Black, Latino, Indigenous and Native American persons, Asian Americans and Pacific Islanders, and other persons of color; members of religious minorities; lesbian, gay, bisexual, transgender, and queer (LGBTQ+); persons with disabilities; persons who live in rural areas; and persons otherwise adversely affected by persistent poverty or inequality.
- Recruiting the next generation of workers from a rapidly diversifying workforce and bringing new workers into the sector at a time of rapid technological change. Small and medium-sized manufacturers (SMMs) will need to focus on recruiting a more diverse and equitable workforce into entry-level production jobs, promoting more equity mobility within manufacturing, from the skilled trades up through management and ownership, and developing and maintaining a culture to sustain equity and inclusion.

## Strategy

Position MEP Centers through funded initiatives to act as the knowledge base and be the connectors and convenors as regional intermediaries. MEP Centers will organize groups of manufacturing companies, identify their workforce needs, and work with partner workforce organizations to coordinate and tailor services to meet the identified needs of U.S. manufacturers.

## Tactics may include:

- NIST MEP will articulate a national workforce strategy for manufacturing in alignment with the market's economic development strategy.
  - Inventory, catalogue and leverage related MEP Center workforce efforts across the Network and coordinate NIST MEP workforce initiatives to provide funding for scaling successful projects
  - Create a knowledge base of manufacturing workforce information captured by MEP Centers and use this information as a foundation for supporting what it means to address the workforce shortage; create and continue federal and national level partnerships
  - Lead development and execution of a national manufacturing workforce strategy, with other federal agencies, state partners, other nongovernmental organizations and stakeholders
  - Develop a workforce playbook that can be a go-to resource for Centers looking to better engage around workforce
- Position MEP Centers as regional/state intermediaries, to organize manufacturers, identify needs and work with partner workforce organizations to address critical issues.
  - Fund or enhance a workforce intermediary in each MEP Center. Working with NIST MEP staff, Centers will:
    - Work with stakeholders to define the current and projected manufacturing workforce needs of their state

- Develop Center/state workforce strategy leveraging federal resources, but tailored to individual needs of state (possibly use Policy Academy-type event)
- Develop industry sector talent partnerships to define and implement training and skill development
  - Special connection to manufacturing technology demonstration facilities with a focus on defined key products, technologies and industry sectors
  - Identify opportunities to fill the gaps in knowledge, skills and capabilities across all areas of the manufacturers' needs, such as financial management, cybersecurity, marketing, etc.
- Design and implement awareness campaigns to educate and entice new entrants to careers in manufacturing
- Develop strategies to tap into multiple workforce pipelines, such as educational institutions, transitioning military and upskilling existing workforce
- Be the voice of manufacturing to educational institutions to develop innovative training and educational programs across the career spectrum
- Convene workforce partners to be intentional about tapping into and removing barriers for underemployed people, underrepresented labor pools, and for supporting diversity and inclusion
- Partner with local community colleges and workforce development boards to optimize funding, to connect industry to education, and to connect industry to recruitment opportunities and/or help create opportunities
- Fund Center-specific projects to:
  - Expand manufacturing apprenticeships, incumbent worker training and other work-based learning experiences with state partners
  - Promote advanced workforce practices to improve culture, with a focus on diversity, equity and inclusion
  - Identify innovative ways to increase productivity and retention to fully use the existing workforce
  - Use learning management systems to deliver products that meet the needs of manufacturers in a timely manner

## Manufacturer impacts

- Improved access to a more diverse and skilled workforce
- Improved access to relevant workforce development offerings
- Input to current and future education and training programs
- Resources available to help SMMs fill their internal pipeline of skilled workers using career pathways
- Higher staff retention rates

## Manufacturing impacts

- Increase in productivity and quality for manufacturing

- Decrease in unfilled manufacturing jobs (companies have the people and talent to manufacture)
- Continual seeding of the manufacturing worker pipeline
- Improvement in the perception surrounding manufacturing jobs

## Desired outcome/metrics and expectations

### What is the desired outcome?

Expanding the pool and diversity of skilled workers choosing manufacturing as a career in each MEP Center market and upskilling existing workforce for the adoption of new technology and practices.

### Metrics and expectations

- Short term (outputs)
  - States with manufacturing workforce strategy implemented
  - Number of companies involved in upskilling programs
  - New hires or placements facilitated
  - Number of outreach activities, including referrals made and manufacturing workforce marketing events
  - Dollars deployed (investments made) as part of Center/state workforce strategy
- Longer term (outcomes)
  - Ability of companies to fill talent needs
  - Growth in manufacturing employment of a diverse workforce
  - Growth in rate of pay
  - Diversity of the manufacturing workforce
  - Improved perception of manufacturing jobs

**Fund Center-specific projects including:**

Potential Project	Manufacturer impact	Workforce impact	Metrics	Project Pricing Estimates
Expand manufacturing apprenticeships and include a diverse workforce	<ul style="list-style-type: none"> <li>Upskilled workforce</li> </ul>	<ul style="list-style-type: none"> <li>Diversity of new workforce</li> <li>Skilled workforce</li> </ul>	<ul style="list-style-type: none"> <li># of companies participating</li> <li># of new apprenticeships</li> <li># of underrepresented people in apprenticeship</li> <li># of minority-serving institutions (MSI) participating</li> <li># of new partners engaged to support statewide efforts</li> </ul>	<ul style="list-style-type: none"> <li>\$150,000-\$500,000 (this could pay for staff, trainers, materials, depending on how long and how many different types of apprenticeships.)</li> </ul>
Expand/develop new workforce training with local and state partners (e.g., industry supported bootcamps)	<ul style="list-style-type: none"> <li>Access to skilled workforce</li> <li>Jobs filled</li> <li>Input to current and future education and training programs</li> </ul>	<ul style="list-style-type: none"> <li>Job placement</li> </ul>	<ul style="list-style-type: none"> <li># of companies participating</li> <li># of new placements</li> <li># of underrepresented people trained</li> <li># of underrepresented people placed</li> <li># of MSI participating</li> <li># of new partners engaged to support statewide efforts</li> </ul>	<ul style="list-style-type: none"> <li>\$100,000 - \$400,000 (like apprenticeship, costs are for staff, materials, trainers. A smaller center could do a lot with \$100K for 1-2 years)</li> </ul>
Promote advanced workforce practices to improve culture, especially through HBCUs, with a focus on diversity, equity and inclusion (e.g., implement and enhance Smart Talent)	<ul style="list-style-type: none"> <li>Retention of skilled workforce</li> <li>Improved recruitment success</li> </ul>	<ul style="list-style-type: none"> <li>Job satisfaction</li> </ul>	<ul style="list-style-type: none"> <li># of companies with projects</li> <li>Turnover rate improvement</li> <li>Demographic data tracked (yes/no)</li> <li>What are you tracking?</li> </ul>	<ul style="list-style-type: none"> <li>\$200,000-\$400,000                             <ul style="list-style-type: none"> <li>Depending on project timeline-\$400K would be for up to 3 years</li> </ul> </li> </ul>
Identify innovative ways to increase productivity and retention to fully use the existing workforce	<ul style="list-style-type: none"> <li>Upskilled workforce</li> <li>Workforce retention/reduced turnover</li> </ul>	<ul style="list-style-type: none"> <li>New skills achieved</li> </ul>	<ul style="list-style-type: none"> <li># of companies involved in upskilling programs</li> <li># of incumbent workers trained in new skills/technology</li> <li># of new partners engaged to support statewide efforts</li> </ul>	<ul style="list-style-type: none"> <li>\$150,000 - \$500,000 This is consulting projects. Centers would have staff or contractors doing work at companies. figure \$25K+ per company)</li> </ul>

Potential Project	Manufacturer impact	Workforce impact	Metrics	Project Pricing Estimates
Use learning management systems to deliver products meeting the needs of manufacturers in a timely manner	<ul style="list-style-type: none"> <li>Manufacturers have access to flexible training</li> <li>Rural and very small manufacturers participate in more training</li> </ul>	<ul style="list-style-type: none"> <li>Individuals have flexible access to training</li> </ul>	<ul style="list-style-type: none"> <li># of new rural companies participating</li> <li># of very small companies participating</li> <li># of new partners engaged to support statewide efforts</li> </ul>	<ul style="list-style-type: none"> <li>\$200,000 - \$1M</li> <li>Platforms could be up to \$200K per year, center would want to commit to 2+ years as a pilot, then access materials/programming and staff for delivery.</li> <li>\$1M-\$2M if multi-center, One platform, but license cost would be expanded. Each center would need \$250K + each for delivery pilots</li> </ul>
Position the MEP Center as regional/state intermediary, organizing manufacturers, identifying needs; work with partner workforce organizations to address critical issues	<ul style="list-style-type: none"> <li>Improved access to a new diverse and skilled workforce</li> <li>Improved access to relevant workforce development offerings</li> <li>Input to current and future education and training programs</li> </ul>	<ul style="list-style-type: none"> <li>Growth in manufacturing employment of a diverse workforce</li> <li>Diversity of the manufacturing workforce</li> <li>Improved perception of manufacturing jobs</li> </ul>	<ul style="list-style-type: none"> <li>State manufacturing workforce strategy implemented</li> <li># of outreach activities, including referrals made and manufacturing workforce marketing events</li> <li>Dollars deployed (investments made) as part of Center/state workforce strategy</li> <li># of MSI participating</li> <li># of new partners engaged to support statewide efforts</li> </ul>	<ul style="list-style-type: none"> <li>\$300,000 - \$1,000,000</li> <li>Depending on time of project. estimate \$200K+ per year for a full time person and then funding for projects and partners.</li> </ul>
Implement regional or statewide pipeline development initiatives (e.g., internship programs targeted to diverse candidates)	<ul style="list-style-type: none"> <li>Increased new employees interested in manufacturing careers</li> </ul>	<ul style="list-style-type: none"> <li>More youth entering manufacturing jobs and manufacturing-related education programs</li> </ul>	<ul style="list-style-type: none"> <li># of students engaged</li> <li>Diversity of students engaged</li> <li>Student perception changes regarding manufacturing careers</li> </ul>	<ul style="list-style-type: none"> <li>\$300,000-\$600,000</li> <li>Could be less over time. Funds could help off set intern stipend to get started. Center needs to staff the outreach, intern recruitment, and help companies implement the intern in the organization</li> </ul>
Lead ongoing discussions regarding the future needs of small manufacturers	<ul style="list-style-type: none"> <li>Awareness of future trends</li> <li>Access to continuously updated training offerings</li> </ul>	<ul style="list-style-type: none"> <li>Workforce with continuously up-to-date knowledge and skills</li> </ul>	<ul style="list-style-type: none"> <li># of seminars, forums conducted</li> <li># of partners identified (original equipment manufacturers, defense firms)</li> <li>Workforce skills identified</li> </ul>	<ul style="list-style-type: none"> <li>\$50,000 - \$250,000</li> <li>These could be smaller starter projects to help with Mfg. Day type activities.</li> </ul>

NOTE: The above are different tactics and a center can choose one tactic or several tactics within their proposals and can also choose tactics among different program areas or one program area. Pricing is reflected to gauge the level of effort and cost per market.